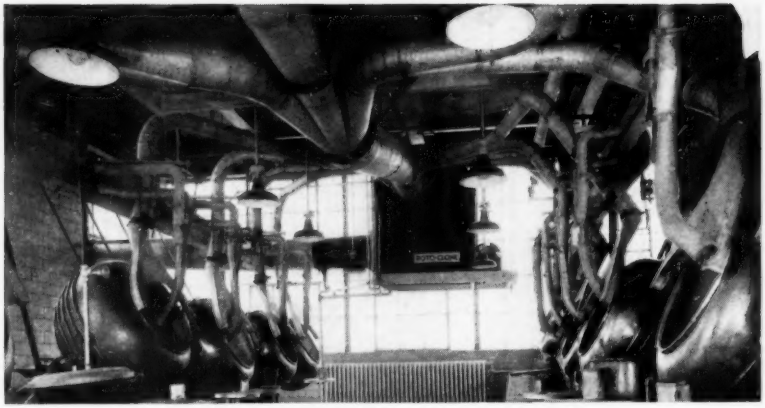
Occupational HAZARDS

Grain elevator showing a typical installation of efficient dust collectors — Photo, Courtesy The Day Company

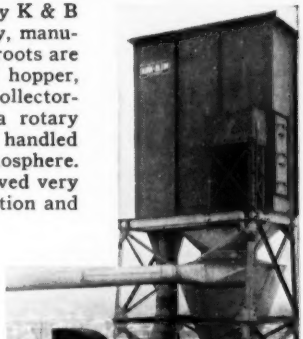
MAR 18 1940
PERIODICAL DIVISION

Profit in Prevention



K & B AIR HANDLING SYSTEM CONVEYS ROOTS AND HERBS

THIS unique system was designed and built by K & B Engineers for the Wm. S. Merrell Company, manufacturing pharmacists of Cincinnati. Herbs and roots are picked up through a specially-designed swivel hopper, delivered under high vacuum to a combination collector-arrestor filter, and dropped by gravity into a rotary mixer. 3000 pounds of finest materials can be handled per hour without dusting or loss to outside atmosphere. Only 7½ h.p. required. The installation has proved very satisfactory, and has helped to increase production and lower manufacturing costs.



Put your dust or fume removal problems up to our Engineers. They will make a careful survey of your plant and recommend a definite solution. Write today for details of this service.

THE KIRK & BLUM MFG. CO., 2816 Spring Grove Ave., Cincinnati, Ohio

Chicago Representative: C. P. Guion, 1661 N. Milwaukee
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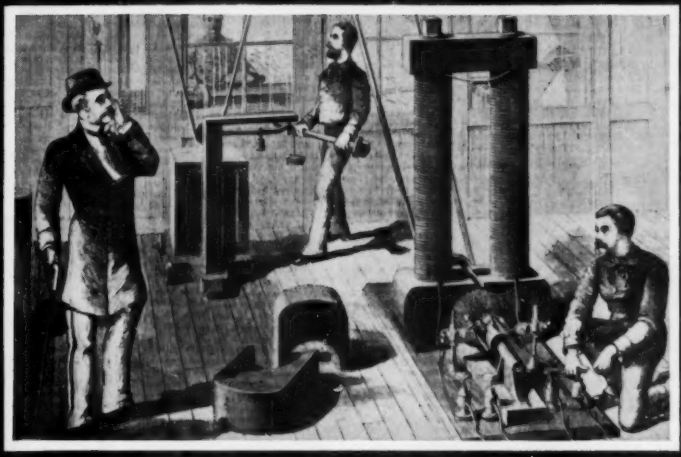
KIRK & BLUM

DUST AND FUME CONTROL

ENGINEERS AND CONTRACTORS

Parade of Progress—No. 2



One of the first electric generators used for industrial purposes. About 1875

DISCONTENT is the first step in progress—discontent with the limitations of existing methods and practices. For instance, Safety Executives, keen to reduce their accident losses, used to stock Safety Shoes right in their own plants. Only to find themselves burdened with extra expenses, the nuisance of "shoe store problems", and in many cases, employee resentment. Of course they were discontented with this situation. To correct it, the Thom McAn Foot Safety Plan was developed—was adopted in hundreds of the Nation's leading industrial plants—another step forward in the endless parade of progress. Get the full story—send in the coupon today.

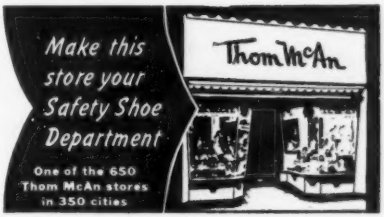
THOM McAN: SAFETY SHOE DIVISION
Dept. D-3 555 FIFTH AVENUE, NEW YORK

Without obligation, please send me full details of your Foot Safety Plan. If you will stock Safety Shoes for our plant in your own stores, at no risk or expense to us, and have your own trained men fit them, I want to know all about it.

Company name .....

Company address .....

Executive's name .....



We think that you will be particularly interested to know what Mr. Edgar C. Barnes of Westinghouse says about the hazards of changing processes: "Past experience has indicated that one of the vulnerable spots in any program of preventing explosions is the protection of an experimental set-up of any kind or the trying out of new materials or processes in existing equipment. Our two most serious explosions in the past two years have been the result of either a change in a process or an experimental set-up." To which we add—changing process or materials without properly evaluating the hazards to health of workmen is risky business. Be sure you control the hazards in the new process, and you'll prevent occupational disease.

No. 301

Specialists in Protection of Eyes and Heads

Expedients are expensive when compensation is costly. SELLSTROM EXCEL QUALITY EYE PROTECTORS are specialized safeguards—scientifically built for safety and comfort—specially designed for varying occupations—economical to buy.

New Goggles, new Helmets and Shields, new Masks have been recently added to our line; lighter in weight, stronger construction.

WRITE FOR OUR NEW CATALOG

SELLSTROM MFG. CO.
648 N. Aberdeen St. Chicago

A lot for a little

Employee health is money in your pocket. *BUT, THEN WE* suppose that there are many industrial managements who have "just happened" not to have had employee disability because of an industrial disease. They say "I know there are a few hazards in this operation, but we've never had any trouble. Why get excited about it?"

If common ordinary common sense doesn't tell us that hazards improperly controlled are a very real source of expense, the law of averages will prove it. We have figures to show that a certain number of cases of compensable occupational diseases occur for every million hours worked in any given industry. You may be lucky. You may not have had your share. If your not having an occupational disease is the result of preventive measures, then you are reasonably protected. If you're just lucky, you probably have some employee disability coming to you—by the law of averages.

It's nothing to get scared about. It's just a matter of realizing that you may have a potential or real hazard hanging over you.

Thousands of employers have found that it takes but very few compensable disabilities to raise their costs. The cost of a preventive program can usually be more than covered by the cost of one or two disabilities.

Here is the point we want to make. If you have a potentially hazardous operation, and have escaped any occupational disease—you're lucky. But don't count on your luck. It may turn on you and shoot your costs up. You needn't take this chance. With an adequate program of prevention and control of hazards, you can be sure that you're not asking for trouble. Our great danger is in not realizing the danger sufficiently before it's too late.

Do You Change the Air in Your Plant Often Enough?

DO IT QUIETLY EFFICIENTLY ECONOMICALLY with "BUFFALO" BREEZO FANS

Ventilating engineers recommend that the air be completely changed in some plants—at least every 5 to 10 minutes, to have working conditions at their best for employees, both from a standpoint of health and maximum production efficiency.

The Buffalo Breezo will help you solve that ventilation problem, quietly, efficiently, and at a low cost. Try one or two of these better ventilating fans in one department, and you will be quickly convinced that their installation throughout the entire plant will prove an excellent investment, especially with hot weather ahead.

For complete information, write today for Bulletin 3222. It gives many helpful suggestions for installing Buffalo Breezo Fans for best results.

BUFFALO FORGE COMPANY

191 MORTIMER STREET BUFFALO, N.Y.

Branch Engineering Offices in Principal Cities
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

The publications briefly described in this service department are prepared by manufacturers' technical experts. The data they contain on equipment supplies and prevention methods applies to varied phases of occupational hazard problems. Note those items desired on coupon below and send to Occupational Hazards, 812 Huron Rd., Cleveland, Ohio.

255—SAFETY FLOORING
An illustrated catalogue of safety flooring, mats, treads, and other rubber non-slip devices for transportation and industrial purposes has been issued by the Melflex Products Company.

256—HOODS, HELMETS AND GAS MASKS
Full details and prices on the above protective devices are contained in a catalog issued by the Pulmosan Safety Equipment Corporation. See page 6.

257—SPARK-PROOF, SLIP-PROOF FLOORS
A discussion of the many industrial uses and the simplicity of application of their Plastic Rock Floor Resurfacer is contained in informational bulletins issued by The United Laboratories, Inc.

258—HELMET PROTECTION
Bulletin No. 97 by the W. W. Sly Manufacturing Company, points out the operating features of their Government Approved Purair Helmet for use in protection against dust and fumes.

259—HEATER-VENTILATOR UNIT
The Buffalo Model "VD" Unit Heater serving the double purpose of heating in winter and ventilating the circulating air in summer is described in a bulletin recently issued by the Buffalo Forge Company. See page 3.

260—PROPELLER FANS
A Catalog replete with illustrations, types and styles of propeller fan construction and a discussion of their improvements is the latest release of Propellair, Inc., Springfield, Ohio.

261—OXYGEN BREATHING APPARATUS
Announcement of the most recent development in M.S.A. Oxygen Breathing Apparatus, a new One-Hour *Back-Type* Model, is included in Mine Safety Appliances Company's Bulletin No. BM2. See back cover.

262—DRILLING LINE HANDBOOK
Containing specifications and recommended practices on wire rope, the new handbook issued by the Macwhyte Wire Rope Company catalogs information on the handling, care, use and abuse of wire lines in the oil fields.

263—WASHROOM LAYOUTS
The Bradley Washfountain Company discusses planned washroom layouts in their new "Plan Book."

264—TOILET PARTITIONS
A 20 page catalog presenting a wide range of styles, colors, finishes and materials is the latest by the Sanymetal Products Company.

265—PERSONAL PROTECTIVE DEVICES
Sellstrom Manufacturing Company announces a new catalog describing their complete line of goggles, respirators, etc. See page 2.

FREE LITERATURE COUPON Clip out and paste on postcard or enclose in envelope.
Mail to: OCCUPATIONAL HAZARDS, 812 Huron Road, Cleveland, Ohio.

Nos. of desired items .....

Firm Name .....

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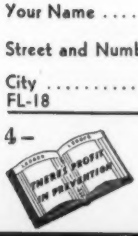

266—DUST CONTROL SURVEY SERVICE
Kirk & Blum Company makes available its engineering staff in recommending suitable dust control and fume removal systems. See inside front cover.

267—SAFETY SHOE PLAN
Details on a method for distributing safety shoes are contained in a booklet issued by Thom McAn. See page 1.

268—FUL-VUE GOGGLES
"News About Ful-Vue Goggles" is a recent publication announced by the American Optical Company. See inside back cover.

Do You Know . . .

that since rubber gloves are used for protection, it is obviously necessary that there be no leaks in them when new, and that the best of care be taken to see that none develop? A simple or so-called rough field test for the glove is to grasp the opposite edges of the cuff and twirl it to fill the glove with air, then firmly hold the cuff closed with one hand, so that no air will escape, and squeeze other parts of the glove to be sure that no air leaks through the palm, the back, thumb, or fingers.

That distillates such as gasoline, naphtha, kerosene and other petroleum products should never be used to wash the hands or arms? The solvent removes essential oils from the skin and may cause skin irritation.

That the area of skin burn is far more serious than the depth? Dangers to life from burns are (1) severity of the pain, (2) loss of fluid, and (3) absorption by the blood stream of products of tissue destruction.

That when a workman performs a task under poor lighting, his alertness is decreased and his susceptibility to accidents increased. Artificial light is required in factories and shops about 20 to 50 per cent of the total working hours, not including overtime or night work.

AVOID SKIN IRRITATION

PRO-TEK is a greaseless cream which helps to protect the skin from physical contact with materials which may stain or cause irritation. Send for free booklet. E. I. du Pont de Nemours & Company (Inc.), Dept. O-1, Wilmington, Del.

Tune In: DuPont "Cavalcade of Americe" every Tuesday, 9 p. m. E. S. T. over N BC.

DU PONT
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THE INVISIBLE GLOVE

New York Meeting

The Eleventh Annual Convention of the Greater New York Safety Council will be held April 16, 17 and 18 at the Pennsylvania Hotel selected as convention headquarters. There will be an extensive exhibit of safety devices and educational material; and four or five simultaneous meetings dealing with various phases of the safety problem will be held each morning and afternoon.

W. Graham Cole, Director of Safety, Welfare Division, Metropolitan Life Insurance Co., is chairman of the convention committee.

Clean Clothing Essential

A habit of the average workman is to clothe himself with garments which will resist wear and not show dirt. Grease, paint and dirt should not be hidden even in clothes.

Some employees and employers will not face the fact that grease covered clothes are hazards, yet there are numerous records of deaths and severe burns caused by the ignition of oil or paint soaked clothes.

Where men must necessarily work in oil, grease, chemicals, or paint, the supervisory staff of these occupations should make periodic inspection of their men and insist on clean clothing. It is a fact that clean clothed workmen are more alert and safety conscious.

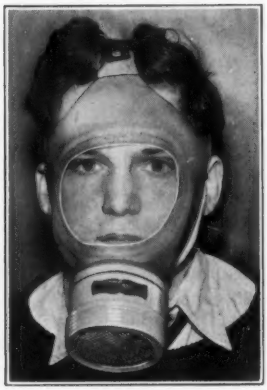
Open Pittsburgh Office

American Machine and Metals, Inc., has announced the establishment of an office in Pittsburgh, Pennsylvania, to handle their line of De-Bothezat Ventilating Equipment. R. A. Armstrong will be in charge of sales in that area.

New Appointment

Detroit Rex Products Company, Detroit, Michigan, manufacturers of Detrex solvent degreasers, alkali washers and cleaners, and dry cleaning equipment, announce the appointment of E. L. McIlhenny as manager of the Alkali Division. Mr. McIlhenny, who formerly worked out of the Cleveland office, will have charge of all sales and service of the company's complete line of alkali cleaners.

Pulmosan #1500 FUMEGARD



• ***A New, low-cost, Face Mask for Gases—Fumes—Smoke!***

This #1500 Fumegard Face Mask, weighing only 14 ounces, does the work of bulkier, costlier gas masks. Its new design eliminates straps, hose and chest canister, yet gives adequate protection against acid and organic fumes (except carbon monoxide), including Ammonia, Chlorine, Refrigerants, Smoke, etc. Has special rubber face piece—large, full-vision plastic windows—and metal canister containing ¾ lb. of absorbents . . . all combined in one unit. Three-point suspension of headbands gives comfortable, airtight fit. Canisters refillable at low cost. Learn more about this economical, efficient #1500 Fumegard. Write for details and prices.

PULMOSAN SAFETY EQUIPMENT CORP.

Dept. OH, 176 Johnson St., Brooklyn, N.Y.

Occupational HAZARDS

MARCH 1940

Volume 2 Number 6

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812 Huron Road, Cleveland, Ohio

Irving B. Hexter, President — L. P. Aurbach, Vice-President
Jack Weis, Associate Editor — William S. Papworth, Associate Editor

This large milling firm in the middle west has minimized the explosion hazard by installing effective dust control measures. (Photo, Courtesy The Day Co.)

Dust Explosions in Industrial Plants Can Be Avoided

By DAVID J. PRICE, Engineer
U. S. Department of Agriculture, Washington, D.C.

RESEARCH studies on the prevention of dust explosions in industrial plants have been going on for several years.

As a result of this activity, it would appear reasonable to expect that the officials and employees in industrial plants where explosive dusts are produced would be fully informed as to the hazards of dust explosions and the methods that should be employed for their prevention or control. However, the investigation of some recent explosions has definitely indicated that many of the less experienced employees in a number of industrial plants have not had the occasion to become familiar with the dust explosion hazard, and that the educational work carried on twenty years ago must be resumed with the oncoming generation.

A given group of employees in some recognized hazardous industry may be

fully informed as to the importance of fire and explosion safety measures, with resultant notable decrease in fire and explosion losses, but as a new generation comes into the industry educational activities must be continued in order to maintain the improved record. A striking example of this is furnished in the field of dust explosion prevention.

Some Comparisons

A comparison of two explosions in different lines of industry may serve to indicate the importance and value of continued safety education.

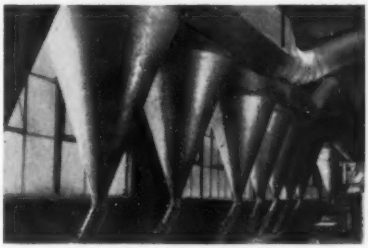
(a) *Explosion in Boiler Room—Brewing Plant*

An explosion in the boiler room of a brewing plant resulted in the death of five persons, injuries to several others, and extensive damage to the building and equipment. This explosion occurred during the elevating of coal tar pitch, used for fuel, from a delivery truck on the street level to the top of the storage bunker on approximately the fourth floor of the building. The use of electric welding equipment during repair work on the steel elevator leg casing while the equipment was running was considered responsible for the ignition of the pitch dust cloud produced in connection with the unloading, elevating, and storage operations. *The investigation of this explosion disclosed that, although the operating official had been in charge of the boiler plant for approximately fourteen years, he was not adequately informed on the dust explosion hazard.* This explosion showed definitely that repair operations of any kind in plants where explosive dusts are produced should not be carried on while equipment and apparatus are in operation.

(b) *Explosion in Starch Factory*

In contrast with the explosion just cited, it is of particular interest to consider an explosion which occurred in a starch factory a few months before. No employees were either burned or injured and the property loss was less than $500, chiefly *because the management and employees were familiar with the dust explosion hazard and had applied proper preventive measures for the elimination of dust explosions in starch factories.*

The fact that there was no loss of life in this explosion, no employees injured, and the property loss was very small is particularly significant when it is recalled that a previous explosion in this same plant several years before caused the loss of 42 lives, injuries to many others, and property damage of about $750,000. The earlier explosion, of course, oc-



Battery of all-metal dust separators in actual operation. Dust trapped by cyclone principle. (Photo, Courtesy The Day Co.)

curred prior to the development of the safety code for the prevention of dust explosions in starch factories.

The limited effects of the explosion in this starch plant indicate definitely the splended work which has been done in the prevention of dust explosions. No life has been lost from a dust explosion in the starch and corn products industries since September, 1930—a period of almost nine and a half years. *This remarkable record is a significant indication of the value of the work of the safety organizations in the industry.*

Research Work of the U. S. Department of Agriculture

The research studies of the bureau of Agricultural Chemistry and Engineering, U. S. Department of Agriculture, show that under favorable conditions a dust explosion can occur in any industrial plant or manufacturnng establishment where combustible dust is created during manufacturing operations. When these research studies were undertaken it was generally supposed that it would be necessary to grind or crush grain and produce the powdery, starchy materials from the inside of the grain before an explosive dust would be encountered.

This was due largely to the fact that an explosion of flour dust produced in the manufacture of wheat flour in a Minneapolis mill in 1878 caused the loss of 18 lives and extensive property damage. A large number of dust explosions in grain elevators, where no grinding or manufacturing operations were engaged in, showed definitely that the dust produced in the handling, elevating, conveying, and storing of grain, also was explosive.

Extent of Dust Explosion Losses

In the last 20 years there have been 386 dust explosions in industrial plants in the United States during the handling, milling, and processing of products of agricultural origin. In these explosions 267 persons lost their lives and 694 others were injured. The property and stock losses (insurance paid) amounted to $27,444,175.

Reduction in Losses in Food Industries

It is very gratifying to observe that good preventive work has resulted in a marked reduction in losses from dust explosions in industrial plants in recent years. The comparative losses for the last two ten-year periods are as follows:

Losses for 10-year period, 1919 to 1928, inclusive	$18,249,900
Losses for 10-year period, 1929 to 1938, inclusive	$10,052,785
Reduction in losses for 10-year period	$ 8,197,115
Average annual reduction in losses approximately	$ 820,000

Grain Elevator Losses

Although losses from dust explosions have been reduced materially in the food-manufacturing industries which have cooperated in working out and adopting practical safety and preventive measures against dust explosions and resulting fires, there is still need for more definite attention to the development and application of methods for the control and prevention of dust explosions in grain elevators. Since 1930, 56 grain elevator explosions have been reported. In those explosions 40 people were killed, 145 were injured, and the property losses amounted to more

(Continued on page 28)

A Program of Accident Prevention for the Construction Industry

By E. W. BULLARD, President Bullard Co.
San Francisco, California

MANY contractors have found that the inauguration of a well-planned safety program or the intensification of the present program produces an actual cash dividend. This dividend comes not only through the increased efficiency provided through reduction of injuries, but in the actual cutting of compensation insurance costs, allowing for greater profit on contracts and lower bids on future work.

That the construction industry stands to benefit materially through a better program of accident prevention is indicated by the fact that it ranks third in the list of thirty industry groups both for frequency and severity of injury. It is exceeded in frequency only by the meat packing industry, the mining industry and the logging and lumber industry: and in severity by the logging and lumber industry, the quarry indus-

Workers are trained to administer first aid to one another right on the job. First aid kits are easily accessible.

try and the mining industry.

This unenviable position can be improved by the construction industry as a whole and under the "experience rating" plan can be vitally affected by each individual contractor. A study of the experience of a number of contractors selected at random gives proof that such improvement can be achieved and that it pays dividends in cold cash.

The following listing shows the number of cents saved on each dollar of normal premium that would have been paid had the accident experience been nearly average.

	CREDIT
General Contractor	21.5%
General Contractor	19.7%
General Contractor	21.6%
General Contractor	21.3%
Road & Railway Construction Contractor	16.7%
Road & Railway Construction Contractor	9.5%
Roofing Contractor	14.9%
Oil Field Trucking Contractor	20.3%
Pile Driving Contractor	36.9%
Marine & Jetty Contractor	13.7%
Plumbing Contractor	13.7%
Steel Erection Contractor	7.2%
Water Well Drilling Contractor	22.8%
Cable Tool Drilling Contractor	27.1%

Each of the above contractors has had not less than two full years in which he has maintained a credit and several of them have had such records for five to ten years.

Compensation insurance costs nation-wide are based primarily on the direct comparison of pay-rolls spent to injury costs incurred. These pay-rolls are in hundred dollar units and the comparison gives the injury costs per unit. To this product is added the operating costs of the insurance companies and the result is known as the "manual rates." This rate presents the composite average of all individuals in a given industry, made up of the experiences of those individuals who are better than average and of those who are worse.

Recognition is given to this "better" or "worse" condition by means of what is known as "experience rating"—superimposed on the "manual rate," whereby the "better than average," incurs a penalty above "manual." There are numerous instances of policy holders who, presenting a safety program vigorously, have decreased their "manual rate" by as high as 60%, and others who, by lack of realization of the importance of an adequate safety program, have incurred a penalty of as high as 200%. This means that one has paid only 40 cents on the dollar for insurance protection, while the other has paid $3.00 *for the same protection.*

Study Necessary

The inauguration of a safety program or the revision of the present program should begin with a study of the past accident history of the company involved. It should be determined if possible whether the majority of accidents were caused by a lack of safety program, lack of safety equipment or lack of appreciation of the value of proper equipment and program by the personnel. If there is a weakness in any one of these factors, care should be taken to improve it either by a revision of the safety program, the acquisition of new safety equipment, or by better training of the personnel.

Safety procedure differs on every job, but it is safe to say that any precaution which may save an injury is a profitable one. Study the hazards of the particular job involved and make sure that everything pos-

sible is being done to counteract these hazards. A check should be made of each employee at the time of his employment to determine his susceptibility to the hazards in question. For instance, a man with a history of tuberculosis should certainly not be put in a position involving dust and other respiratory troubles. Also a continuous study of the adaption of each worker to the hazards of his work should be maintained.

The use of proper safety equipment is a very important factor in the achievement of a good accident prevention record. Safety equipment alone will not prevent all accidents, but past records show that the companies who protect their men with all available efficient safety equipment have the best accident prevention records. The following paragraphs list common pieces of safety equipment and their proper use.

Head Protection

The wearing of Hard Boiled Hats is compulsory in practically all tunneling operations and on many construction jobs. Their use has saved hundreds of lives and prevented many serious injuries. Each man should have his individual hat for comfort, protection and sanitary reasons. The hat should be of the same size as is normally worn to insure a fit snug enough to remain on his head in any position. The hammock is a vital part of the hat for, if the wearer's head should come in contact with the top of the hat proper, practically all protection is lost. The hammock should be inspected frequently to make sure that it is performing its function correctly.

On a recent construction job involving a good deal of loose rock, one man removed his hat to shield a match for his cigarette. A small rock chose this opportunity to drop on his unprotected head and stretched him out without a sound. His coworkers revived him with a liberal dose of water. He grinned sheepishly, clapped his "Hard Boiled" back on his head, and to this day has never been known to lift it more than three inches from his head.

Saving eyesight has always been a part of industrial accident-prevention work. That the necessity for the use of goggles is not yet fully recognized,

(Continued on page 26)

Men respond more rapidly to the use of accident prevention equipment when it is within easy reach and maintained effectively.

Right off the Docket

The trend of litigation on workmen's health and accident compensation is reflected in these briefs of the latest and most representative cases coming to trial in the intervals between issues. Familiarity with this trend is important to every industrialist.

Occupational Disease Claim Held Not Barred by Statute of Limitations

The Workmen's Compensation Act of Missouri provides that a claim for compensation for an occupational disease must be filed within six months from the time it became reasonably discoverable and apparent that the compensable disease has been contracted. The disease in this case was lead poisoning contracted through continued work handling scrap metals, including lead.

The claimant went to work for the company in 1927 and continued in their employ until 1935, at which time he was discharged after the plant physician reported that he had high blood pressure, and that the likelihood of an apoplectic stroke made him a hazard on the job. Within six months of his discharge the claimant filed a claim for compensation. It was granted. The company claims the award was erroneous, contending that the claimant had known in 1932, four years before filing his claim, that he was suffering from lead poisoning, and consequently his claim had not been filed within the six months' limitation period.

The Court rejected the Company's contention, stating: "An injury which starts the running of the statute of limitations provided for in Workmen's Compensation Act, occurs in an occupational disease case at the time when the disease produces a compensable disability, and mere fact that the employee has reason to know that he is suffering ill effects which, even though attributable to natural incidents of employment, have not progressed to the point of in anywise impairing his capacity for work is insufficient to start the running of the statute."

Smith vs Federated Metals Corporation et al (Missouri) 133 S.W. 2nd 1112 (Dec. 1939)

* * *

Injury to Head and Back Aggravating Tubercular Condition Brings Death Award

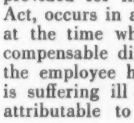
The deceased worker was employed as a pumper on an oil lease. He had an accident sustaining injuries to his head and spine. The doctors testified that the worker, previous to the accident, had a tubercular condition, that the accident lowered his vitality and resistance and aggravated the disease, and was a contributing cause to his death. An award was granted to the widow of the deceased employee.

Texas Employers Ins. Assn. vs Watkins et al (Texas) 135 S.W. 2nd 296 (Nov. 1939)

* * *

Slippery Floor Results in Fatal Fall

A night watchman, weighing 190 lbs., and apparently in sound health, was making his rounds preparatory to going home. He slipped on a part of the floor of the plant which was oily and greasy from machinery, and fell. In falling he struck his head against a sharp-edged steel beam, inflicting a severe bruise and cut over his eye. He died within four or five minutes after the fall.



The company sought to prove that the death was not the result of an accident, but that the employee had suffered a heart attack or a stroke of apoplexy. The Court refused to accept this contention ruling that under the circumstances it was reasonable to infer that the death was due to the injury incurred in the fall, and that the only testimony to the contrary was wholly conjectural.

Dorminy vs American Mut. Liability Ins. Co. (Georgia) 6 S.E. 2nd 67 (Dec. 1939)

* * *

Paralysis Caused by Heavy Lifting

In this case the claimant was suffering from arteriosclerosis (hardening of the arteries). He was engaged with another worker in unloading 600 sacks of cement from a railroad car on to trucks. Each sack weighed about 94 lbs. Immediately after unloading the cement, which took about 40 minutes, the claimant felt weak, fell down, and was unable properly to use his left arm and leg. He was taken home and an examination revealed that he had suffered a cerebral hemorrhage resulting in paralysis of the left arm and left leg.

The Court made an award. It held that the paralysis due to cerebral hemorrhage resulted from the continuous exerting labor of lifting the 600 sacks of cement, and that within the meaning of the Compensation Act it was "an injury by accident arising out of and in the course of employment."

Griggs vs Lumbermen's Mut. Casualty Co. (Georgia) 6 S.E. 2nd 180 (Dec. 1939)

* * *

Over-Exertion Causes Cerebral Hemorrhage — Previous High Blood Pressure Does Not Prevent Award

The worker died from a cerebral hemorrhage suffered while performing heavy and over exerting work lifting rice sacks. It was proved that the employee prior to his death was suffering from high blood pressure, and that such condition made him susceptible and predisposed to cerebral hemorrhage.

The Court in making an award stated, there was sufficient evidence to show that the over-exertion was the direct producing cause of the fatal hemorrhage, and that the death was not caused solely by disease. The company cannot escape liability by showing a pre-existing disease, or by showing that the employee was pre-disposed to cerebral hemorrhage.

Consolidated Underwriters vs Christal (Texas) 135 S.W. 2nd 127 (Jan. 1940)

* * *

Splinter in Thumb Causes Death

The deceased employee had worked for a number of years puttying glass in white pine sash. It was not unusual for workmen engaged in this work to get splinters of wood in fingers and hands. On a Friday, the employee in this case got a splinter in his thumb. He did not report the injury, but went home that evening and treated the injured finger with home remedies over the week-end. Monday the finger was swollen and inflamed, he reported the injury. Despite treatment death resulted.

Fellow employees, who had heard the deceased exclaim at the time he got the splinter in his thumb, established the happening and an award was made.

Sharp vs Sears Roebuck & Co. (N.J.) 9 Atl. 2nd 795 (Dec. 1939)

* * *

Osteomyelitis Develops from Brass Particles in Clothes

An award in this case was granted to the claimant for temporary and permanent disability resulting from the amputation of one leg.

The facts were: The claimant was employed in a factory as a brass polisher. In the course of his work small particles of brass became dislodged from the pieces being polished and settled on the skin and in the clothes of the employee, causing scratches on the skin. The claimant's right leg became swollen, and he was forced to stop work and was taken to a hospital. The physicians there found a large number of healed scratches on the claimant's arms and legs. They also found his right leg swollen and infected with osteomyelitis (inflammation of the bone-marrow) which had been caused by infection resulting from the scratches of the brass particles. It was necessary to amputate the leg to check the spread of infection.

Mecca vs Phoenix Brass Fittings Corporation (N.J.) 10 Atl. 2nd 491 (Jan. 1940)

Digested and compiled by
HILTON E. ROBERTS
Member of Ohio and New York Bars

Proper sanitary facilities encourage clean workmen—save money through elimination of occupational diseases.

For Dividends—Clean Workers

SOME MEN think they need to be covered with dirt to do a good job. This is seldom the case. Ordinarily the clean worker is the better worker. In industrial plants, cleanliness pays money dividends, particularly in the prevention of skin troubles which cause suffering, impaired efficiency, and loss of time.

It is generally believed that skin ailments are unavoidable in certain industries because of the basic elements which comprise certain products and the conditions necessary to manufacture them. Extensive research has proven otherwise. Certain individuals are naturally susceptible to certain products and need to protect their skins or else keep away from the substances to which they are sensitive. But at least 90 per cent of industrial skin troubles (not including burns from acids and alkalis) can be avoided by soap and water cleanliness. When blemishes actually develop frequent soap and water scrub-ups constitute at least half the treatment.

Skin eruptions such as blackheads, pimples, and boils often occur when dusty, oily, irritating, or non-irritating substances are rubbed into a *dirty* skin—a skin that was dirty before the work began. The eruptions usually appear on the part of the skin most exposed to these substances. The mule skinner is likely to become infected along the upper leg. The zinc oxide worker, handling bags of material or mending dusty bags, breaks out across the lower part of his body and on the upper part of his legs.

Temperature and humidity are also factors in the cause of industrial skin disorders. Working conditions have a great deal to do with their prevalence. Certain skins are more susceptible to certain conditions than others.

In industries where cutting oils or compounds are used, and where various kinds of dust are found, there is believed to be an increase in dermatoses when workers perspire freely. Dry-skinned persons and persons troubled with excessively oily skin (seborrhea) are more susceptible than those with normally oily skins. Prob-

ably part of the answer lies in the fact that more dirt is taken up by perspiration. The worker, attempting to keep perspiration out of his eyes and off his hands, often brushes his hands and arms across each other, then across his forehead and the back of his neck, thus rubbing in the dirt.

If the substance is toxic, so much the worse. Moreover, if dusty, dirty work clothes become soaked with perspiration and oil, every movement of the body grinds in the irritating substances and grime.

When the skin becomes irritated, when bacteria from dirty skin are carried by dirt, grease, non-poisonous or poisonous substances into the openings of skin around the hairs, the way is open for infection. When itching parts of the skin are scratched with bacteria-laden finger nails or rubbed with dirty hands, arms, or clothing, the skin is broken and its defense against infection destroyed.

Soaps Used

For cleansing the skin of grease and soil, many mild soaps are effective. This is an important point, for it is commonly believed that treatment of this type of industrial skin disorder calls for the use of special soaps of so-called high germicidal action or upon the addition of antiseptics to the compounds or cutting oils. It is assumed that the chief trouble comes from organisms that have contaminated the oil. The fact is, however, no known germicidal substance has been demonstrated to sterilize the regions under the nails where pus-forming organisms are present. These germs are probably the cause of many secondary infections which have been caused by plugged skin openings and inflamed by foreign material.

Precautions

Before work is begun, change from street clothes to work clothes. Scrub up with soap, running warm water, and a brush. Follow with application of a protective cream or lotion. Scrub up thoroughly before lunch and again after lunch. Apply protective cream again before going back to work.

At the end of the working day, give the skin a complete soap and water cleansing (if possible, under a shower), and a good rub-down with clean towels before changing back to street clothes.

Wear work clothes designed especially to protect the skin from dust and oil. If possible, they should be made of closely woven fabrics and cut to fit snugly at the neck, wrist, ankles, and waist-line. Leather aprons help to prevent abdominal irritations.

Place a clean band around the forehead to keep the perspiration from dripping down into the eyes and to protect the skin of the forehead from contact with soiled hands or arms.

Keep work clothes clean and dry. Have them laundered frequently. A daily change of outer clothing and underwear is of course, the ideal. Many plants find it practical to have work clothes laundered on the premises.

After work clothes have been removed they should be kept in an airy locker room to dry thoroughly.

Such a program calls for adequate washing facilities, cooperation among the workers, and strict supervision. How successfully it can eliminate skin troubles is shown in the records of many progressive organizations where it has been put into effect.

This month in *Washington*

Safety Contests

By W. T. Cameron, Chief Safety Adviser, Division of Labor Standards, U. S. Department of Labor

THERE is probably no method which has been more widely used to arouse and maintain interest in safety than the safety contest. Its use has been extended from industry to traffic, child, home, farm and public safety. Its wide-spread acceptance as a tool in the prevention of accidents is proof of the realization that every safety man's first, last and all-time job is to sell the safety *idea* and keep it sold. Whether the prize is a celluloid button, a silver cup or a hundred dollars, contests are successful because they appeal to basic human instincts —man's craving for self-expression, his desire for recognition, his love of competition.

So popular has the safety contest in industry become that I am tempted to list some of the elements of a good contest and suggest some of the pitfalls to avoid. First and foremost, the ultimate objectives should be kept in sight at all times. So dramatic is the contest idea, so high runs the enthusiasm that we are apt to forget that a contest is only a means to an end—only *one* element in a well-rounded safety program. If we divide the second of the three E's of safety (Engineering, Education, Enforcement) into its component parts, we have roughly two subdivisions—interest-arousing activities ("propaganda") and safety training. Engineering should come first—so before starting any rivalry for safety or, in fact, any activities to enlist the cooperation and interest of the men, show some tangible evidence of management interest by spending money on guarded machines, good housekeeping, safe walkway surfaces, efficient illumination, etc.

The most successful contests are those in which all of the details are carefully worked out in advance, the statistical method discussed and made

clear to the participants, and the situations which make for discontent and bitterness anticipated and answered before the contest starts.

When you've worked out the details try to look ahead and see what will arise in the way of controversy, alibis by the losers, how much conscious or unconscious cheating may take place through that "burning desire" to win at any cost. For instance, if the number of first aid cases handled during the course of the contest is one of the factors, you can expect to find an immediate dropping off of the number of men reporting for first aid treatment, taking a chance on the foreman's iodine bottle. Have the contest committee ask itself the question, "What about the groups or units that find early in the contest that they have no chance of winning?" After all, these are just the groups you wish to stimulate by the competition.

The next warning is not to complicate the contest with obtuse or illogical statistical methods. To find out whether your method has "sales appeal" bring in one of your workers and ask him if he can follow your reasoning in multiplying frequency by severity, adding cost and dividing by the "hazard factor." No matter how logical your multiplying peaches by apples and dividing by oranges may seem to you, if the average worker can't understand it, throw it out.

Requirements for Good Safety Contest

Having reviewed a good many safety contests of one kind or another, I've about come to the conclusion that every good contest should contain the following elements:

The contest should run for a full year and continue from year to year with periodic recapitulations, preferably monthly, with some secondary award which can be made to the department or unit making the best showing in the contest during that period.

Although less spectacular, it is sometimes advisable to have the units compete for the accomplishment of a *standard of achievement* with a suitable award for each group that reaches the goal established. This has the advantage of pitting large units against small units on an equitable basis and removes such factors as "hazard exposure" and "man-hours worked," both of which are beyond the control of the individual unit.

Instead of setting up your contest on a pure frequency, severity or cost basis, it is better to devote at least half of the contest points to "method of reaching the desired goal." This removes the element of luck and allows your whole safety program to be tied in and emphasized in the contest. Under this scheme you would give points for well conducted safety committee meetings, good housekeeping, use of personal protective equipment, following safe practices, etc. By awarding more points for the accomplishment of certain things that need attention (based on your previous accident experience) in this second part of your contest plan, you can really put your contest to work as a "means to an end."

It is also well to consider the use of an item, "per cent of betterment of record," in addition to straight accident frequency and severity. This is particularly helpful in bringing the units that have made a poor showing in the past into the spirit of the competition because of their chance of

making more points than the outfit whose past record is going to be hard to beat.

The last and most important part of the contest, often overlooked, is the periodic contest analysis. There is no easier way to offer constructive criticism to the unit "in the cellar" than by being able to say, "On this point you were right up with the top 30 per cent, while on this you were below the average of the top group, and here is what you can do about it." The more "jockeying" for first place you can have from month to month, the greater will be the interest in the contest. Through introducing a number of elements, each properly weighted, such as frequency rates, severity rates, per cent of betterment of previous month's record, and a half dozen requirements on method of achieving results, you'll develop some real rivalry.

There are dozens of ways of publicizing the day by day or month by month contest standings, one of the most effective being to tie the current results up to seasonal sporting events. The final prize doesn't need to be much for all of us will do things for the love of the game or for the recognition that comes out of winning that we'd never do for money. A pocket knife or watch fob suitably embossed is often just as effective as a bronze plaque, a silver cup, or a cash bonus.

Safety contests have a place in every safety program. They can be a headache or a tonic, depending upon the amount of forethought and ingenuity put in at the beginning.

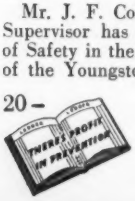
Gets Promotion

Mr. J. F. Collins, formerly Ass't Safety Supervisor has been appointed Supervisor of Safety in the Youngstown District plants of the Youngstown Sheet & Tube Co.

To Remove Metal Fragments From the Eyes

A new alnico magnet for the removal of metal fragments from the eyes and from surface wounds has been devised by the General Electric Research Laboratory in Schenectady. Though not designed to replace electromagnets in this field, the new instrument is more powerful than earlier permanent magnets used for the purpose. Sintered alnico, an alloy of aluminum, nickel, cobalt, iron and copper, is used with a high permeability insert of nickel iron to collect the lines of flux at the point. The magnet is light and can be handled almost as easily as a pencil, as shown by the photograph.

The April issue will be devoted to Good Housekeeping. Watch for it.



Are you handling BENZOL?

A Review by A. C. MEECHAM

WHETHER you call it benzol or benzene, it still is a cause of a significant amount of occupational disease. Benzol (for that's what we're going to call it in this discussion) is one of the most commonly used of all industrial solvents. By virtue of the number of workers exposed to it, it deserves our most serious consideration.

Benzol is used as a solvent, and is in turn used in making other solvents. This, in part, accounts for its widespread presence as a hazard to the health of workmen. For example, the table herewith shows some of the more common occupations and industries where benzol is used in hazardous concentrations.

Benzol is widely used throughout industry, especially in using and making industrial solvents. Workers most likely to be exposed to benzol include:

- Airplane-dope workers
- Artificial-leather makers
- Benzol-still men
- Blenders (motor fuel)
- Brake-lining makers
- Cementers (rubber)
- Compounders (rubber)
- Degreasers (fertilizer and leather)
- Driers (rubber)
- Dry cleaners
- Dye makers
- Enamel makers
- Enamelers
- Engravers
- Explosive workers
- Glue workers
- Lacquer makers
- Lacquerers
- Linoleum workers
- Nitro-benzene makers
- Nitrocellulose workers
- Oilcloth makers
- Paint-remover makers
- Paintmakers
- Paraffin workers
- Phenol makers
- Photoengravers
- Pyroxylin-plastic workers
- Reclaimers (rubber)
- Shade-cloth makers
- Shellac makers
- Shoe finishers
- Varnish makers
- Varnishers
- Vulcanizers

Benzol (benzene) is a coal tar derivative (not to be confused with benzine, a petroleum distillate), and has some properties in common with the other hydrocarbon solvents. With the exception of tetrachlorethane, benzol is the most dangerous of this group of solvents. Industry has come to recognize it as being such but it still

exists in a great many operations.

One inherent property of benzol, that of rapid evaporation at ordinary temperatures, makes absolute control measures highly desirable. Because of this rapid evaporation, it gets into the air easily, is inhaled by workers. This is the way benzol poisoning occurs. Breathed in by workers, it goes to the lungs where it is dissolved in the blood stream.

Chronic poisoning, caused by inhaling moderately small amounts of benzol over an extended period, is rather the more common form of disability. When the benzol vapors get into the workers' lungs, and thence into the blood stream, the result is a blood disease in which red cells are not formed. Benzol poisoning assumes many of the symptoms of non-industrial blood diseases, and is, therefore, difficult to diagnose properly.

Acute Type

Some of the first manifestations in the cases of mild chronic benzol poisoning are headache, loss of appetite, nervousness, and sleeplessness. The more severe cases of chronic poisoning are indicated by anemia, hemorrhages, reduction in white and red blood cells, and a general weakness.

Because of the highly toxic nature of benzol, and because industry, recognizes it as such, sufficient care is usually exercised to prevent many cases of acute benzol poisoning. As is often the case in such situations, the most dangerous substances cause fewer cases of acute poisoning than less toxic substances because of the greater care habitually used in handing the dangerous one.

Acute benzol poisoning, while more rare than chronic, is a sudden and severe disability. Experience has shown that most cases in recent years of acute benzol poisoning have been the result of accidents, and not of an unaware inhalation over long periods. One of the most common sources of such accidents is in the cleaning of tanks and vats, and similar jobs.

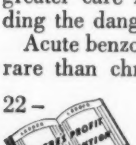
When a large quantity of benzol is inhaled, the victim quickly becomes unconscious. Paralysis of the breathing system usually follows, and the results are fatal in many cases.

In cases of acute poisoning, less severe than those just mentioned, the early signs ars usually a breathlessness, undue excitement, delirium. As the intensity of the poisoning grows, convulsions lead to unconsciousness, the paralysis of the breathing system mentioned above, failing eyesight, and, in extreme cases, death.

When a worker has been overcome by benzol fumes, he should immediately be rushed to fresh air. The prone type of artificial respiration is indicated, and he should be kept warm. Of course, it is obvious that a doctor should be summoned with all possible haste.

Chronic Type

Acute cases such as these described leave no doubt that something radically has gone wrong. With the chronic form of the poisoning, it is not always easy to tell that benzol poisoning has set in. The symptoms described above (under chronic poisoning) will be sufficiently distressing to make the worker suspect that he is not up to normal. His suspicions in conjunction with the realization that he has been exposed to benzol indicate immediate consultation with a doctor familiar with this poisoning, its diagnosis and treatment.



The picture painted here is a black one. Actually, in spite of the highly toxic nature of benzol, it is possible to control exposures to it. Many manufacturers have substituted other materials for benzol because of its dangerous nature, but it is still used in a great many places, and it is for these places that preventive measures have been devised.

Preventive Measures

As is the case with so many preventive programs for the control of toxic substances, the first point in prevention is to keep the benzol out of the air. Remember that it evaporates easily. Provide exhaust ventilation which will remove the benzol fumes immediately they escape from the operation. This means, practically, to prevent the fumes from ever getting into the air. Adequate exhaust systems are available that will take up the fumes at their point of origin, and carry them away.

As an accessory to the specific exhaustion at the source, good general ventilation is desirable. This will prevent whatever minute amounts of the fumes that do get into the air from reaching dangerous concentrations. Note, though, that a concentration of one part benzol in 10,000 parts air is recognized as being dangerous, so don't depend upon general ventilation diluting the fume to a point of innocuousness. Elimination of fumes at the source is first, general ventilation, second.

Enclosed Process

Wherever possible, benzol should be displaced by another and less toxic substance. Next best to this is the totally enclosed process. However, when using enclosures, maintain the greatest vigilance in keeping the system in good repair.

Similar vigilance should also be exercised in the maintenance of exhaust systems, too.

In this same vein, where the use of benzol is necessary, it is well to have those operations requiring it to be isolated in separate quarters, apart from the general work rooms. This will reduce the number of workers who might be exposed.

Where very limited exposure to benzol is encountered, gas masks should be provided. The gas masks will also prove invaluable in emergencies, and should always be kept on hand in good repair for such cases.

Where adequate exhaust ventilation might be impractical, oxygen breathing apparatus is recommended. Positive pressure hoods can also be used here.

In operations where it is necessary for workers to come into contact with liquid benzol, gloves and aprons should be provided, so that the liquid need not come into contact with the skin.

To check upon the efficacy of these preventive measures, make it a point to inspect all apparatus regularly, and to have the air tested periodically to determine the presence of benzol fumes.

Medical supervision of employees will be further insurance against the development of poisoning. By having a periodic examination, including blood examination, it will be possible to assure yourself that your preventive plan is working properly.

Effective industrial lighting will be discussed in the April Good Housekeeping issue. Watch for it.

New Produc

OIL AND ACID RESISTANT SUIT, manufactured from Neoprene, synthetic rubber, is announced by The Industrial Products Company. The new suit is particularly useful in resisting oils, alkalis, acids and the solvents that disintegrate natural rubber in a short time. A variety of sizes and styles available.

HANDY TOOL. The safety factor is greatly increased by the several pieces of equipment used in various combinations to perform literally thousands of jobs on production, construction, and maintenance work that has been designated the "Util-A-Tool" by its maker, Templeton, Kenly & Co. This new multiple tool comes in a compact metal carrying case with complete instructions and suggestions for its use.

The Util-A-Tool's applications include: spreading and pulling together structural members or any movable objects within its 10-ton capacity; pushing, hoisting, lifting, lowering, clamping, bracing, and tensioning.

The Util-A-Tool also removes gears, wheels, pulleys, and marine propellers, according to the manufacturer. Five sizes are available at the present time.

FACE SHIELDS, for which important advantages in design and construction are claimed, is announced by the Mine Safety Appliances Co. Intended for use on jobs where goggles are not absolutely required, yet protection to the head desirable, the M.S.A. Faceshields are said to afford comfortable protection against hot sparks,

chemical splashes, flying grit, dust, etc., and are available in three models—without sparkshield, with semi-sparkshield and full sparkshield.

Additional information and descriptive literature on any of the products mentioned in this service department may be obtained by writing ***Dept. N,*** OCCUPATIONAL HAZARDS & SAFETY, *812 Huron Road, Cleveland, Ohio.*

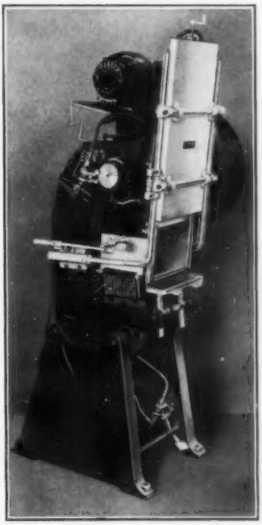
THE FIELD

DRUM CARRIER. A safe way of handling drums and barrels is found in the new carrier, designed by Chas. K. Ernst, Inc. Barrels and drums are locked to the carrier, lifted off the floor, placed and released without a hand touching the container. Carrier will be shipped on a trial basis.

NEW PAINT—designed for use under extreme corrosive conditions, has been introduced recently by the B. F. Goodrich Company, Akron, Ohio. When thoroughly dry, this "Keroseal" paint will withstand all acids, alkalis and salts in the concentrations commonly encountered in industry up to temperatures of 150°F.

SAFETY CARBOY POURER—Lewis-Sheppard Sales Corp. announces the development of a new type of safety carboy pourer. Light in weight and rigidly built, it may be easily handled by one man, quickly and safely. Developed in cooperation with the Aluminum Corporation of America to handle the new all-aluminum carboys, the pourer is designed to permit pouring of small quantities, or of emptying the carboy completely.

PUNCH PRESS GUARD. The American Allsafe Co., Inc., Buffalo, N.Y., announces a new Allsafe Airgard for punch presses. Operating with compressed air, it can be applied to either the back or front of any style press and permits forming, blanking and strip feeding. Upon pressing the foot pedal, a valve is opened which brings the gate down to a closed position. Then two other valves open which operate the clutch-pulling cylinder. The gate must be down before the press can operate and it will not come up until the press has stopped.



Statements made in connection with any product mentioned in this service department are based on manufacturers claims. Although these claims are believed to be true, this magazine does not guarantee that to be the case.

THERE'S PROFIT IN PAR-TICIPATION

Construction Industry . . .

(Continued from page 13)

however, is indicated by the fact that each year in the United States there are more than 300,000 industrial injuries to the eyes, each resulting in at least one day of disability. In 2000 of the cases there is complete loss of vision in one or both eyes. The total loss of time from work because of eye accidents has been estimated at 3,600,000 days annually, and the total cost in compensation and medical bills is some $50,000,000.

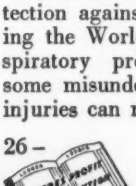
Application of the particular type of goggle depends on the job involved. Wire screen types are sometimes preferred underground, as glass goggles tend to fog due to high humidity conditions. There is no doubt but that glass goggles with safety lenses afford more complete protection, but on many jobs it is difficult to get the men to wear them when exposed to a hazard.

Respiratory Protection

The dust hazard underground or in close quarters can be greatly alleviated by proper ventilation, use of water sprays and other standard equipment. There are, however, certain places in an operation where it is necessary to provide the men with correctly designed respirators to protect them. Much progress has been made in the development of respirators, especially following the impetus received through the need for protection against poisonous gases during the World War. The use of respiratory protection still involves some misunderstanding, and serious injuries can result from misuse. Mechanical filter respirators give protection against substances, such as silica dust and fumes of zinc, lead, etc. Respirators should be chosen for comfort to the wearer, for efficiency as a filtering or cleansing agent, and for ease with which the air can be inhaled and exhaled. Equipment that holds exhaled air inside the face piece causes a rapid rise in fatigue, and it is advisable that a respirator be fitted with a check valve. As far as possible, only those pieces of respiratory equipment which have received official approval from the United States Bureau of Mines for the particular purpose for which they are intended to serve should be used. (A list of approved devices and their manufacturers may be obtained.) However, for protection against nontoxic or purely "nuisance" dusts, such as lime dust or soap powder dust, some authorities believe that the lighter weight and lower resistance mechanical filters have a definite place. Some filters fail to meet the requirements of the United States Bureau of Mines, not because they fail to remove fumes but because they offer resistance to breathing. In the use of mechanical filter respirators, it must be remembered that they are of no value in an atmosphere deficient in oxygen, nor where protection must be afforded against a gas or vapor. Neither will a respirator prevent a poison from being absorbed through exposed skin.

Foot Protection

It has been estimated that 24% of all industrial accidents are to the legs and feet, and that 20% of all workmen's compensation payments are for foot and leg injuries. Safety shoes are increasing in all construction



jobs, their use in many cases now being compulsory. Leather safety shoes are indicated for use in dry places, and boots or bottles with hard toes in very wet places. Canvas or leather leggings or spats are frequently employed when hot metals or other liquids must be handled. Leggings used around hot substances should not have projecting wrinkles, clasps, etc., where liquids might lodge and burn through to the flesh.

Safety Education

Starting with the idea that the majority of accidents can be eliminated by proper supervision, the management should see to it that every boss is an enthusiastic booster of "Safety First." He should be a safety inspector for his division, as men can be reached and influenced most easily by those with whom they are in direct daily contact.

The system of paying a bonus to the crews maintaining certain standards in accident prevention also serves to make the personnel safety conscious. Direct prizes for safety records can consist of belt buckles, knives, key rings or other personal equipment with the insignia of the company and a safety emblem.

First Aid

One hundred per cent first aid training has been found to be a definite aid in accident prevention as it arouses safety consciousness and is an excellent way of carrying safety training to the men. First aid contests between teams from different parts of the organization may be held at intervals and are excellent methods of stimulating interest in this work. These contests create a competitive spirit which is not only conducive to the safety training promotion, but overlaps into the accident prevention field as well.

In addition to first aid training for the personnel, adequate first aid equipment should be available on the job. It is advisable to have a complete supply of equipment, stretchers, blankets, etc., in the safety office. If the organization is a large one, stretchers and large first aid kits should be scattered at strategic points throughout.

In addition to these large kits, many organizations have found it economical and advisable to equip each crew with a first aid kit. Such kits are undoubtedly an effective way to combat infection as they enable the workman to apply an antiseptic and dressing to the injury immediately after an accident.

Strict adherence to the above principles of accident prevention and the use of proper tact in selling these methods to workers will help immeasurably in reducing accidents in the construction industry

When the Call is For
"A Bandage -Quick!"
Use **Band-me-Quick** new Individual Bandage. Made of Gauztex. Self-adhering gauze sticks only to itself—not to flesh. Medicated pad. 9-inch length. Keeps out dirt yet air circulates freely. **No Throw-Aways.** Each Band-me-Quick cellophane wrapped. **Stays fresh.** 100 to a box. Order from supply house or GENERAL BANDAGES, INC., 508 S. Dearborn St., Chicago.
GAUZTEX
Band-me-Quick

Grain Elevators . . .

(Continued from page 10)

than $7,500,000. These 56 explosions were almost 36 per cent of the total number of explosions reported during the period.

It must be recognized, therefore, that the most disastrous losses from dust explosions are occurring in terminal grain elevators, and that satisfactory progress has not been made in the control of dust explosions in this branch of the grain-handling industry. Much of this can be assigned to the lack of provision for adequate dust control during handling, storing, and shipping operations.

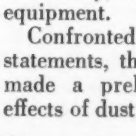
In considering this matter several years ago when it was apparent that extensive losses were occurring, the Bureau of Chemistry in the Department of Agriculture learned that many of the dust-collecting systems installed in grain elevators throughout the United States could not be used, or were dismantled because of the objections of the officials having jurisdiction over the weighing of the grain. The weighing departments stated that grain weights were greatly affected by the action of suction used in the collection of the dust. Reports of tests conducted by a number of elevator operators, however, indicated that the weight of the dust removed is almost negligible. Some men experienced in grain handling stated that less dust is removed by suction than is lost in handling grain by means of poor machinery, with no dust-collecting equipment.

Confronted with these conflicting statements, the Bureau of Chemistry made a preliminary study of the effects of dust collection on the weight of grain. The results of this study showed that much depended on the design and installation of the dust-collecting equipment. In many cases the equipment seemed to have been installed with no knowledge of the fundamentals of good design. In some cases the claims of weighing departments that grain had been drawn out by improper application of suction to remove the dust at certain points between the car which was being unloaded and the scales probably were correct. No information concerning a generally accepted method of applying suction or the proper equipment to use could be obtained. Every elevator seemed to have its own system of dust control and no standards existed. None of the systems was so installed as to permit inspection, nor were any of them so designed that it would be impossible to lift grain by increasing the speed of the fan, with a corresponding increase in suction.

It will be necessary to develop and install effective methods for dust control and collection in grain elevators to reduce dust explosion losses. Until this is done it will not be possible to make progress in dust explosion control in terminal grain elevators comparable to what has been accomplished in the control of dust explosions in other grain and milling industries.

Effect of New Manufacturing Processes

Dust explosions may occur in any industrial plant where combustible dusts are present as the result of the installation of some newly developed equipment. Many of the dust explosions in recent years in the United States have been directly associated with the introduction of new manu-



facturing processes which have opened up additional sources of ignition, and have resulted in conditions favorable to explosions. *It is therefore highly desirable that new manufacturing operations be carefully examined to detect possible dust explosion hazards, and that attention be given to the adoption of preventive measures.*

Safety Codes for Dust Explosion Prevention

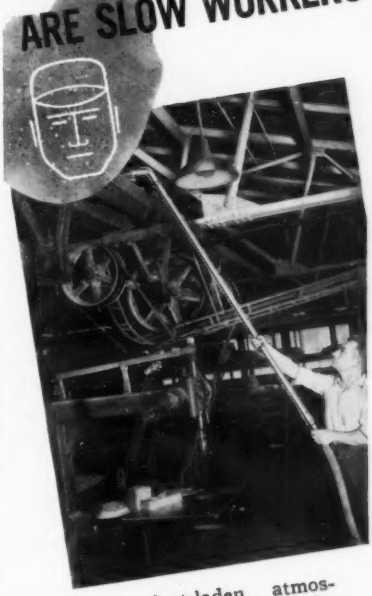
The reduction in dust explosion losses has been due largely to the adoption of the measures recommended in the safety codes which have been developed by the Dust Explosion Hazards Committee of the National Fire Protection Association.

The following safety codes developed by the Dust Explosion Hazards Committee have been adopted by the National Fire Protection Association and the National Board of Fire Underwriters, and approved as "American Standards" by the American Standards Association.

1. Flour and feed mills
2. Sugar and coca pulverizing
3. Pulverized fuel installations
4. Terminal grain elevators
5. Starch factories
6. Coal pneumatic cleaning plants
7. Wood flour manufacturing establishments
8. Spice-grinding plants
9. Wood-working plants
10. Use of inert gas for fire and explosion prevention
11. Aluminum-bronze powder manufacturing plants.

A safety code for the prevention of dust explosions in the handling, grinding, and storing of sulphur has been recently prepared by this committee as well as an outline of Fundamental

DUST-BREATHERS ARE SLOW WORKERS



Insidiously, dust-laden atmosphere slows up the workers who breathe it—and your production suffers accordingly! To stir up the dust by old-fashioned cleaning methods only aggravates the trouble. If your employees are to be freed of this menace, dust must be eliminated—not just redistributed. Vacuum cleaning is the only solution and Hoffman engineers will recommend the most efficient and economical system to meet the needs of your plant.

Send for Booklet "THE MENACE OF DUST"

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Principles for the Prevention of Dust Explosions in Industrial Plants, not covered by special codes.

Factors in Dust Explosion Prevention

The two principal factors in dust explosion prevention in industrial plants are:

1. Effective measures for control and removal of explosive dust
2. Elimination and control of sources of ignition.

Some Methods for Prevention and Control of Dust Explosions

Some of the methods that have proved effective for prevention and control of dust explosions can be listed as follows:

1. *Effective Dust Collection and Dust Removal Systems.*

Cleanliness and good housekeeping are of prime importance. *A dust explosion cannot occur unless combustible dust is present.*

2. *Removal of Foreign Material from Grain.*

Investigations have indicated definitely that dust clouds have been ignited by sparks from metal particles.

3. *Inert Gas Protection in Grinding and Pulverizing Operations.*

The reduction of the oxygen content of the air in enclosed systems by the introduction of an inert gas, such as carbon dioxide (CO_2) in grinding and pulverizing operations has proved effective.

4. *Protection of Electrical Appliances and Equipment.*

The danger of inadequately protected electrical appliances and equipment has been definitely established.

5. *Control of Static Electricity.* Static electricity must be recognized as one of the prominent causes of dust explosions, and provision should be made for the effective removal of static charges from all types of mechanical equipment handling combustible dusts.

6. *Closed Storage Bins.*

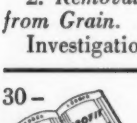
The value of closed storage bins and the undesirability of interconnections between storage bins has been definitely indicated by explosions in grain-handling plants.

7. *Explosion Venting Areas in Grain-Handling and Milling Plants.*

It is possible to vent grain dust explosions without structural damage, and the effectiveness of glass vents in actual explosions has been well established under explosion conditions.

Research work on dust explosion and fire prevention has as its primary object the development of methods and appliances for the protection of human life, foodstuffs, and property.

The practical application of the research already done has resulted in a marked reduction in losses from dust explosions and fires in the grain and milling industries.



Lighting and Air Conditioning Improve Draftsmen's Efficiency

Last summer, The Detroit Edison Co., Detroit, Michigan, checked the output of its draftsmen and found they were getting out 8988 "work units" in 5008 man-hours. Meanwhile, the draftsmen moved into a new windowless building completely air-conditioned and illuminated electrically with 50 foot-candles at the drafting table top. This year, thanks to the conditioning and lighting, the draftsmen required only 3872 man-hours to do 10,474 work units—a 51.4 per cent increase in efficiency. No longer does work become smudged by hot sticky fingers; no longer do the tired eyes of tired men bring about time-consuming errors.

Scientific Eye Protection

American industry is doing an exceptionally fine job in eye protection by providing workers with scientific eye protection against glare and dangerous invisible rays, H. R. Moulton, assistant research director of American Optical Company, declared in addressing a meeting of the safety committee, foremen and supervisors of the Fore River Shipyard on the subject of industrial eye protection.

"By fitting such industrial workers as welders, furnace and foundry men with special types of glass to protect their eyes against the glare of visible light and from dangerous ultra-violet and infra-red rays, many thousands of eyes have been saved, as well as millions of dollars in workmen's compensation," he stated.

Mr. Moulton referred to a unique welding glass that admitted only 3/10,000 of one per cent of visible light and absorbed 100 per cent of ultra-violet and more than 99.99 per cent of infra-red. Twenty-five years

ago, he said, only one commercial welding glass was available which absorbed as much as 75 per cent of the invisible rays.

Although the eye cannot see these invisible rays, he explained, the rays are nevertheless a genuine menace. Unprotected from excessive amounts, the eye is almost literally cooked, resulting first in severe irritation, and later in cataract, which leads inevitably to blindness unless arrested or removed by a delicate operation.

Withstand 1170 lb. Load

In the shipping shed of a paper mill a worker while handling newsprint rolls weighing 1,170 lbs. allowed one to cant a little too far. It fell, and he was unable to get out of the way. The end of the roll came down squarely on his toes. He was

wearing safety boots purchased a few days previously and suffered only a very minor injury. He did not have to stop working. The lack of safety shoes would have cost him several mangled toes.

Pullman Co. Saves $116,000

The Pullman Co. has an order that no one is allowed to enter the plant without goggles. This is one phase of an accident prevention campaign against eye injuries which has cost the company $25,000, but which has saved it $116,000 in two years. The Pullman Co. has 25,000 employees, but a smaller plant has the same opportunity for proportionate savings by concentrating on eye injuries. Spending even $250 to save $1,160 strikes us as a very profitable investment.

Davies Heads Pennsalt Market Research

Well known throughout the chemical and allied fields, Richard L. Davies has been appointed manager of the newly established Market Research Department of the Pennsylvania Salt Manufacturing Company, according to an announcement by Leonard T. Beale, President.

Mr. Davies is known to many in the chemical and allied industries through his sales development work on various Pennsylvania Salt Chemicals, as well as through his chemical manufacturing and usage patents.

Be on the lookout for the April Good Housekeeping issue in which many valuable facts will be contained.

Electric Eye Acts as Safety Agency in Automobile Plants

That tireless automatic device, the "electric eye," which the man in the street knows as a luxury gadget for swinging open doors in a novel manner, serves a number of useful purposes in motor plants.

A tiny metallic retina that "sees" a ray of light with super-sensitivity, the electric eye ranks as one of the star performers in automobile plants. It prevents injuries, eliminates costly damages, and does a variety of other jobs beyond human limitations.

Ever alert and vigilant, the electric eye holds back the mighty jaws of a hydraulic press when a workman comes within close range, thus making mishap impossible.

In placing or removing fenders from a press, for example, the workman's arms, shoulders, chest and ankles all break the light rays, thus preventing the rays from flashing onto photo-electric cells. With this circuit broken, the control relays which operate the presses are blocked. Even if the mighty down stroke of the press has begun, any movement that shades the light rays as little as 10 per cent brings the powerful press to an instantaneous stop.

Such precautions have contributed to the automobile industry's outstanding safety record. Injuries are so few in motor plants that the average automobile worker is deemed to be twice as safe on the job as when he leaves the factory and goes home.

PROTECTION

AMERICAN R1000-C RESPIRATOR

THIS CC1 CARTRIDGE protects against low concentrations of fumes and vapors from paint spray . . . also other light organic vapors.

And this comfortable, "easy-breathing" respirator may be instantly fitted with any of 3 other cartridges: *CC2* for low concentrations of acid gases . . . *CC3* for low concentrations of acid-organic gases . . . *Dust Cartridge* for Pneumoconiosis —producing and nuisance dusts. Only the American R1000 offers this economical 4-way interchangeability. So it always pays to "Buy American, By American."

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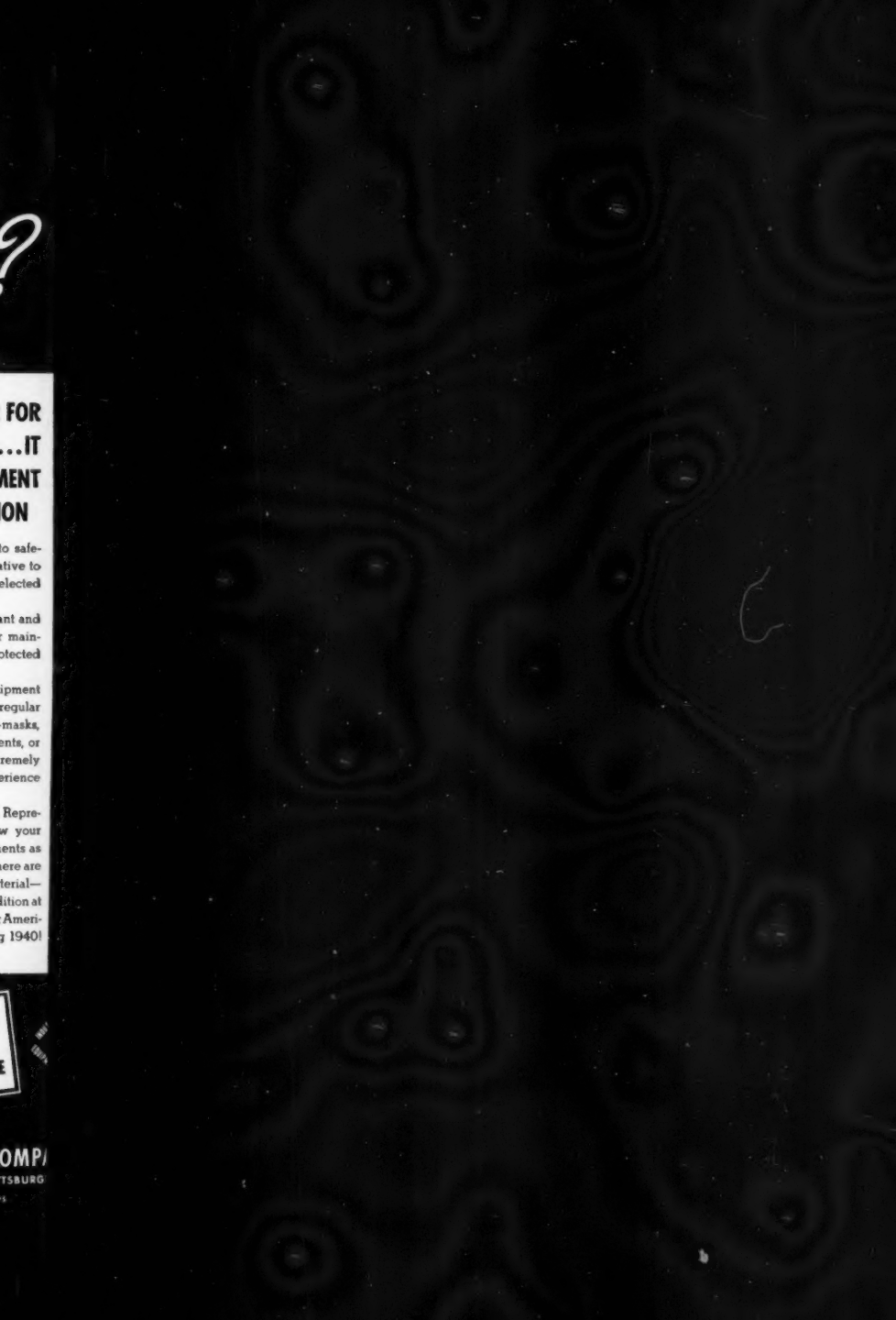
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